

NGS INPUT

I. USERS AND PURPOSE OF NATIONAL GEODETIC SURVEY (NGS) PROGRAMS THAT RELATE TO A NATIONAL COASTAL MONITORING PROGRAM.

A. Coast Survey - NGS supplies accurate digital shoreline data of our nations 95,000 miles of coastline and it's territories that supports the Coast Survey's nautical chart production and hydrographic survey operations. This activity promotes Safe Navigation.

B. Coastal Managers - NGS provides photographs and/or accurate shoreline data to various Coastal Managers. This includes or has included but not limited to the National Estuarine Research Reserve (NERR), NOS's Special Projects Office, National Marine Fisheries, FEMA, Florida Marine Research Institute, Massachusetts Coastal Zone Management and other state agencies including California, Washington, and Oregon. The photographs and/or accurate shoreline are primarily used as a tool for decision making such as a base layer in a Geographic Information System.

C. NGS, University of Maryland and the Horn Point Laboratory, C-CAP, North Carolina State, the Maryland Department of Natural Resources, and state and local interest. - NGS monitors the BAYONET project in the Chesapeake Bay. This study focuses upon variations in sea level, subsidence, and remote sensing of coastlines and habitats. Through regular monitoring, patterns will emerge that will help determine which factors are having the greatest impact on the wetlands; and therefore on the health of the Chesapeake Bay as a whole.

D. NGS and state and local interest - NGS supplies ocean-loading deformations derived from GPS observations. The proliferation of continuously operating GPS tracking sites and improvements in estimating the vertical component of a site's position from GPS measurements presents a unique opportunity to directly observe the effects of ocean tidal loading. This project estimated vertical ocean-loading deformation for approximately 200 permanent GPS tracking sites in North America. Sites along the east coast of North America rise and fall 1 to 2 centimeters twice per day driven by the principal, semidiurnal lunar tide.

PRESENT MONITORING ACTIVITIES, INCLUDING OUTCOMES AND DELIVERABLES.

A. Image Acquisition of Coastal Areas - Products include:

a. About 3500 metric-quality color photographs per year.

b. Digital Shoreline - Some of these metric-quality photographs were obtained for the NOS Coastal Mapping Program. Compilation includes the shoreline, and associated features along the coastal zone that support the nautical chart and hydrographic activities.

Current coastal mapping efforts are in Harris Bay, AK, Yakutat Bay, AK, Lynn Canal, AK, San Francisco Bay, CA, Port Huron, MI.

Active image acquisition may be found at <http://www.ngs.noaa.gov/FIELDOPS/aircraft.pdf> that include coastal mapping, PORTS, NERR, and the Coral Reef Initiative.

c. Satellite imagery is being acquired for the Near Real Time Coastal Monitoring System to monitor shoreline changes of the 13 ports per year. Active projects include Tampa Bay, FL, Charleston, SC, New York, NY, Baltimore, MD, Cape Code Canal and Boston, MA, Seattle, WA, San Francisco, CA, Houston, TX. Deliverable product includes georeferenced images with superimposed nautical chart vectors.

B. BAYONET - Products include:

a. Precise measurements of subsidence

C. Ocean-loading Deformations - Products include:

a. Precise measurements in the order of a 1 to 2 centimeter rise and fall occur twice per day along sites taken on the east coast of North America. This is caused principally by the semidiurnal lunar tide.

These products are used to make informed decisions about the coastal environment.

LONG-TERM VISION/GOALS FOR MONITORING ACTIVITIES

NGS will continue its leadership role as the foremost civilian positioning and remote sensing experts. In doing so, NGS will continue to monitor the National Continuously Operating Reference Station network, which provides the fundamental framework for the National Spatial Reference System (NSRS). NGS will also continue to monitor subsidence and ocean-loading deformation networks, whose primary purpose is to gauge the effect of geophysical processes on the NSRS. The data will continue to be made available to the public. NGS will acquire new remote sensing technologies to monitor the coast in response to customer needs. This would include highly accurate digital elevation models derived from Digital Photogrammetry, Light Detection and Ranging, Synthetic Aperture Radar, Hyperspectral, and Satellite Imagery. NGS will continue to develop these innovative techniques and applications of positioning and remote sensing technologies as well as providing guidance and best-practices.

FY02 BUDGET ITEMS FOR ADDRESSING IMMEDIATE NEEDS TO ENHANCE NOS COASTAL MONITORING

NGS will participate in the Sustainable Coastal Communities NOS Theme for 2002 and beyond including national shoreline and the demonstration project Glen Cove, NY. Under this initiative, NOAA request \$1.0 million for this pilot effort to assist local communities in Glen Cove, NY in sustainably revitalizing their waterfronts.

NCCOS INPUT

The following is input to the NOS Coastal Environmental Monitoring Plan regarding monitoring in NCCOS. It includes only work being carried out in CCMA as this is the only component of NCCOS which conducts substantial monitoring projects as our committee has defined monitoring. I have organized my input to follow the questions you list in your October 27 reminder message to the NOS Monitoring Committee.

First of all, however, I would like to suggest that it would be better to word the definition of monitoring that we agreed to as: NOS Coastal Environmental Monitoring consists of all activities conducted or supported by NOS involving the repetitive, long-term collection of measurements taken to establish a baseline or to determine a trend in environmental conditions and including the management, analysis, and dissemination of these measurements.

Rationale for conducting monitoring, including statements as to who the users are: Rationale--CCMA conducts coastal environmental monitoring for the following reasons: (1) To assess the status and trends in indicators of the environmental quality of the Nation's coastal, estuarine, and Great Lakes environments and the relation of this quality to levels and effects of anthropogenic stressors.; (2) to develop improved diagnostic and predictive capabilities to determine the effects of anthropogenic stressors on the Nation's coastal, estuarine, and Great Lakes resources and on the human uses of these resources; and (3) to develop and disseminate scientifically sound data, information, and services to support effective coastal management and decision-making. Users--There is a broad range of users for the monitoring data and information produced by CCMA including: (1) state and local environmental management agencies, especially state natural resource and environmental protection agencies; (2) other Federal agencies, especially EPA; (3) other components of NOAA including NMFS and, in NOS, ORR and OCRM; (4) regional environmental agencies and compacts such as the Delaware Basin Commission; (5) academic research scientists; (6) public-interest environmental organizations; (7) industrial concerns and other private enterprises concerned with environmental management and control; (8) Congress and congressional committees; and (9) the general public.

Present monitoring activities, including outcomes and deliverables: Mussel Watch Project: Since 1986, the Mussel Watch Project has monitored chemical contaminants in sediments and bivalve mollusks at sites around the coasts of the U.S. including the Great Lakes. The sites where monitoring is conducted are selected to be representative of large coastal areas and to avoid small-scale patches of contamination. The data are used to compare contamination concentrations across space and time to determine which coastal regions that are at greatest risk from toxic chemical contaminants and to identify trends in levels of threat. Presently, mollusks are collected every other year and sediments about every fifth year at a network of over 250 U.S. coastal and estuarine sites. Samples are analyzed for 24 polynucleated aromatic hydrocarbons (PAHs), 18 polychlorinated biphenyls (PCBs), DDT and its break-down products, 16 other chlorinated pesticides, tributyltins, and 11 trace metal contaminants. National Benthic Surveillance Project: From 1984 through 1993, the National

Benthic Surveillance Project monitored concentrations of the same contaminants as measured by the Mussel Watch Project in the livers of bottom-dwelling fish and in sediments on an annual to biennial basis. This project also monitored the biological effects of contaminant exposure, primarily as prevalence of toxicopathic liver diseases, as well as of genetic damage, reproductive impairment, and other biological properties. The project monitored contaminant exposure and bioeffects at about 120 sites nation-wide. This project is presently on indefinite hold due to funding restrictions.

Carolinian Province Environmental Condition Monitoring: As part of a joint monitoring program between EPA's Environmental Monitoring and Assessment Program (EMAP) and NOAA's National Status and Trends Program (NS&T) a comprehensive study is being carried out assessing changes in the quality of estuaries along the southeastern U.S. coast. Sampling was conducted during the summers of 1994-97 and will be repeated in 2000. Measurements are made each year at about 80 sites using a stratified random sampling design. These measurements include observations of a variety of environmental variables which serve as indicators of (1) general habitat conditions, (2) potential pollution exposure, (3) in situ biotic community structure and composition, and (4) aesthetic quality.

South Florida Ecosystem Monitoring: This project is monitoring biological community condition and related properties in coastal areas of South Florida to evaluate the effect of the major efforts being expended toward the restoration of the South Florida ecosystem. This project has a special focus in coral reef areas in the Florida Keys National Marine Sanctuary where monitoring is directed specifically at evaluating the effect of the establishment of protected areas on the coral reef community health and on the levels of important resource species.

Harmful Algal Bloom Monitoring: This project is being conducted in conjunction with a number of state monitoring programs especially in areas threatened by blooms of the toxic dinoflagellate, *Pfiesteria piscicida*. This program monitors for prevalence of *Pfiesteria* and of fish lesions related to this organism as well as for the levels of a number of environmental conditions related to the occurrence of blooms of this organism. The products for all of these programs include scientific papers and reports as well as monitoring data that, in most cases, is available on disk and on the web.

Long-term vision/goals for your monitoring activities: The long-term vision/goal for the CCMA monitoring program is to develop and lead a coordinated national program to monitor and assess anthropogenic impacts on U.S. coastal resources and ecosystems. This program will provide a national capability to measure, understand, analyze, and forecast natural and human-induced environmental change that affects coastal economies, public safety, and the sustained production of ecological goods and services.

FY02 budget items for addressing immediate needs to enhance NOS coastal monitoring:

(1) An initiative has been proposed to establish a nationally coordinated program to monitor, map, and assess U.S. coral reef ecosystems. This program will assure the integration of currently disparate programs/projects being operated by various governmental and private entities at local, regional, state, Federal, territorial, and commonwealth levels into a national monitoring network with consistent database design, comparable data sets, and easy-to-use information. (2) It is also being proposed to implement NOAA'S role in the three-tiered National Coastal Monitoring Program. A substantial plan describing this proposed coordinated interagency monitoring is available.

OR&R Input

OR&R monitoring activities occur on a site-specific basis in the context of monitoring needs associated with oil and chemical spills, and hazardous waste site activities. OR&R monitors, or promotes monitoring, to assess effectiveness of response actions and to improve future response and restoration techniques to minimize environmental impacts to and speed recovery of estuarine and coastal resources. However, because OR&R's work is often funded by other agencies we often do not have the luxury to conduct monitoring to an adequate level.

The most extensive monitoring program conducted by OR&R is its 15 year Prince William Sound (NWS) Long-term Monitoring Program. Since 1989, selected intertidal sites have been monitored yearly to determine the extent to which NWS has "recovered" from the *Exxon Valdez* oil spill and subsequent response operations. Three types of study sites, "oiled with mechanical cleaning," "oiled without mechanical cleaning," and "not oiled," are compared. At each type of site, biological, chemical, and geomorphological monitoring information is integrated to capture a more complete picture. Parameters sampled on the same temporal and spatial scales include:

- Biological - population abundances, recolonization across the full range of intertidal assemblages, including sediment-dwelling infaunal invertebrates, sessile and motile epifaunal invertebrates, and algae.
- Chemical - concentrations of *Exxon Valdez* oil quantified in sediment and biota, and the chemical nature of the oil itself.
- Geomorphological - patterns and processes are coupled with the chemical and biological data to understand which changes in structure prevent, promote, or change the way in which the chemistry and the biology return to a prespill condition.

For example, loss of fine sediments during hot water, mechanical washing of the shoreline, seems to inhibit the recolonization and restructuring of the intertidal zone. OR&R scientists hypothesize that organisms dependent upon a mixture of sizes of sedimentary particles may not recover until the fine sediment fraction is replenished and reincorporated into the impacted substrate.

OR&R is also involved in monitoring activities at hazardous waste sites where OR&R works with response agencies, other trustees, and responsible parties to:

- Promote appropriate monitoring into remedial and restoration actions to measure respective effectiveness
- Develop monitoring protocol for restoration in order to measure success
- Negotiate monitoring strategies during the development of settlements and natural resource damage assessments

Unfortunately, these activities are usually for a short period of time (3-5 years) and tend to vary widely from site to site in the parameters measured.

OR&R's use of NOS monitoring data

OR&R uses NOS monitoring data to create effective products and to provide technical services. For example, when OR&R provides scientific expertise and user-friendly information during a spill, it relies on CO-OP's Physical Oceanographic Real-Time Systems (PORTS) data. PORTS data are used operationally to provide real-time physical processes measurements to drive OR&R's oil spill trajectory models, and are integral in OR&R oil spill planning tools. OR&R also depends on NOS monitoring data to conduct risk analyses in high traffic ports, and to support states in hazards planning and response. Additionally, OR&R uses NS&T data in its Watershed Projects to place site-specific contamination into a regional context.

Future vision

For the future, consistent monitoring of background levels of contaminants within watersheds would allow OR&R to access more reliable baseline information for comparing spill impacts and assessing recovery rates. Longer-term, consistent funding for monitoring restoration projects is needed to glean better knowledge as to whether current restoration practices effectively return habitat to an acceptable level of ecosystem functioning. More complete information on these management actions will advance the "state of the art", increase efficiency, and allow larger scale, more economical habitat restoration in the future.

FY02 Budget Initiatives:

OR&R does not have any monitoring initiatives for FY02. However, any initiative that affects the quality and frequency of NOS monitoring activities (e.g., NCCOS coral mapping and monitoring, and CO-OP's PORTS program) potentially affects OR&R as a primary user of these generated data.

Also, it was suggested from a scientist in OR&R for the committee to take a look at past efforts to develop national monitoring strategies/plans. So, I offer the following comments from the field for the committee to think about:

"I recommend someone cut and paste a flow diagram that shows how monitoring (and R&D) is part of the feed-back loop of management. Someone should look at the 1983-84 OMPA Technical Development Plan written by Doug Wolfe. It contained a strategy that shows how research and monitoring fits into an overall management/action framework, prompting focus on specific problem areas (non-point, wastewater, spills, waste sites, ocean

dumping, etc). A very similar, and even more focused, management-monitoring framework is presented (with a nice diagram) in the NRC 1993 report, "Wastewater Management for Coastal Urban Areas". These documents try to force managers (national, us) to build monitoring directly into the management/action framework and to be accountable to use the monitoring results to confirm the effectiveness of actions (specifically and collectively) and to re-adjust priorities and actions if the actions aren't effective.

Also, the NOS framework does not cite the 1990 NRC review of national coastal monitoring, or its recommendations (Managing Troubled Waters: The role of marine environmental monitoring). We (NOS) spent good money participating in these NRC oversights and we ought to explicitly benefit from the results."

COOPS INPUT

Center for Operational Oceanographic Products and Services

A. Description of Coastal Monitoring Activities

What do we do?

The National Ocean Service (NOS) Center for Operational Oceanographic Products and Services (CO-OPS) collects and distributes observations and predictions of water levels and currents to ensure safe, efficient and environmentally sound maritime commerce. CO-OPS manages the National Water Level Observation Network (NWLON) and a national network of Physical Oceanographic Real-Time Systems (PORTS) in major U.S. harbors. CO-OPS establishes standards for the collection and processing of water level and current data, collects and documents user requirements which serve as the foundation for all resulting program activities, designs new and/or improved oceanographic observing systems, designs software to improve CO-OPS' data processing capabilities, maintains and operates oceanographic observing systems, performs operational data analysis/quality control, and produces/disseminates oceanographic products.

How are we organized?

CO-OPS is organized around two lines of business (LOB); PORTS (optimized for rapid response and real-time services) and Tides and Currents (optimized for precision/accuracy and long-term data management). CO-OPS will be re-aligning into two separate Divisions in January 2000 to support the two LOB's. The two main focus or support areas for FY 2000 are Navigation and Hazards. CO-OPS is headquartered in Silver Spring, MD and also maintains field support offices in Chesapeake, VA and Seattle, WA and is implementing a Oceanographic Systems Test and Evaluation Facility (OSTEF) in Chesapeake, VA in FY2000. CO-OPS is increasingly using private contractors to install, operate, and maintain measurement systems in support of the two LOB's. Note: the above discussion is heavily dependent on the outcome of congressional funding for FY 2000 - the first budget, since vetoes by the president, essentially halted further development and implementation of PORTS, CORMS, and OSTEF in FY2000.

What are our data sources?

CO-OPS data sources are from the PORTS and Tide and Current operational programs that CO-OPS manages. The data can be categorized as physical oceanographic and meteorological measurements and associated metadata as to station/sensor configuration, measurement location and duration, and reference information. CO-OPS produces sets of data and information products from the raw measurements on an operational basis and provides them to users on a real-time and non-real-time basis.

B. Mandates, legal concerns, philosophy:

CO-OPS is statutorily authorized to collect, analyze, and disseminate data on tides pursuant to the 33rd United States Code, Sections 883a-883f established under the auspices of the Act of August 6, 1947 (61, Stat, 787). Most recently, on March 12, 1998, the 105th U.S. Congress passed H.R. 3461, approving a governing international fishery agreement between the United States and the Republic of Poland. This House of Representatives bill, which became Public Law 105-384 on November 18, 1998, authorizes appropriations for conducting tide and current measurements under the Act of 1947 for Fiscal Years 1999 through 2002. Under Section 303(b)(4), CO-OPS is authorized to implement and operate a national quality control system for real-time tide and current data, and to design and install real-time tide and current data measurement systems.

C. CO-OPS Observational Network Descriptions

The Office programs play an important role in NOAA's strategic goals to promote safe navigation and sustain healthy coasts.

The Center for Operational Oceanographic Products and Services (CO-OPS) is responsible for the management of the U.S. National Water Level Observation Program (NWLOP) and the U.S. National Physical Oceanographic Real-Time System Program (PORTS).

National Water level Observation Program

The objective of the National Water Level Observation Program (NWLOP) is to support the goals of the NOAA Strategic Plan with a National capability of water level measurement and a suite of products and services that will meet a full spectrum of user needs. A further objective of the NWLOP is to conduct all program efforts under a documented quality assurance umbrella such that application of water level measurements and derived products and services can be reliably and confidently applied by all users; from real-time application to long term sea level variations.

The purpose of the NWLOP is to provide the Nation with a water level measurement program for the U.S. Coastal Ocean. Program resources and activities are especially targeted towards supporting the Promote Safe Navigation and Advance Short-Term Warning and Forecast Services elements of the NOAA Strategic Plan. The continuity of the observation components of the NWLOP over time has also resulted in Program products being applied to the Implement Seasonal to Interannual Climate Forecasts and Predict and Assess Decadal to Centennial Change missions. The foundation of the Program is the National Water Level Observation Network (NWLON), a network of 189 continuously operating water level measurement stations in the U.S. coastal zone, including the Great Lakes and U.S. Territories and Possessions. The NWLON provides the National vertical water level reference datum system for the NOAA Nautical Charting Program, PORTS activities, HAZMAT activities, US Army Corps of Engineers (USACE) dredging and coastal construction activities, and the coastal monitoring, surveying and mapping activities of coastal states and other

federal, state, and local agencies. The NWLOP also provides a standard set of tidal prediction products and services for the user community. The NWLON, because it is a coastal network of observation locations, provides real-time and near-real time information to NWS storm surge and tsunami warning forecasting activities at the national, regional, and local level.

Specifically, the operational capabilities of the NWLOP are critical to:

1. the Nautical Charting Program by establishing the vertical reference datums from which charted water depths are calculated. Accurate hydrographic surveys and chart products could not be produced without a strong observational network,
2. the PORTS Program by using key existing NWLON stations and establishing reference datums at new locations used in local real-time dissemination of water level and ancillary data,
3. the NWS short-term warning and forecast activities by providing real-time and near real-time access to data for use in marine forecast systems and models, coastal storm surge forecasts, and the hurricane forecasting and modeling activities of the National Hurricane Center,
4. application by other federal, state and local agencies. For instance, the USACE for coastal zone regulation, dredging, and coastal construction; FEMA for disaster mitigation and analysis; and coastal states for surveying, mapping, and marine boundary applications.

The measurements, tidal datums, bench mark elevations, and derived water level predictions are routinely applied to navigation, surveying and mapping, storm surge and tsunami warnings, coastal engineering, and coastal management programs. The data supports navigation through intra coastal waterways, and within estuaries, bays, and harbors. The data assists in the construction of bridges, docks, and deep-water channels. The data is necessary in planning underwater demolition activities as well as other military engineering uses. The data is indispensable to fishing, boating, surfing, and a variety of other water sports activities. The data provides tide and water-level information needed to establish and maintain the vertical water level reference required to support nautical chart production; to determine state and federal boundaries; and to define setbacks from high water lines.

Physical Oceanographic Real-Time Systems (PORTS)

PORTS is a decision support tool which improves the safety and efficiency of maritime commerce and coastal resource management through the integration of real-time environmental observations, forecasts and other geospatial information. PORTS measures and disseminates observations and predictions of water levels, currents, specific gravity, air and water temperature, and many meteorological parameters (e.g. winds, atmospheric pressure, visibility, etc.) Needed by the mariner to navigate safely.

The objective of the national PORTS program are to: promote navigation safety, improve the

efficiency of U.S. ports and harbors, and ensure the protection of coastal marine resources. PORTS provides accurate real-time oceanographic information, tailored to the specific needs of the local community and so they come in a variety of sizes and configurations. Full systems are presently installed in Tampa, New York, San Francisco, and Houston/Galveston. Smaller systems are installed in Chesapeake, northern Cook Inlet, Seattle/Tacoma, and Sault Ste. Marie, Michigan (PORTS Lite Systems).

D. CO-OPS Data Management

CO-OPS has been designated as a Center of Data fundamentally due to how the data and derived products and services are operationally developed and applied. NOAA and CO-OPS are held liable for accuracy and certification of its measurements. There are ongoing dynamic adjustments made to the data over time based on long term continuous measurements. The data sets are not static files in the classic sense as periodic adjustments are made to the data to update them to new tidal datum epochs. The interpretation and application of the data sets for the public are made by the same expert personnel who process, analyze and quality control the data. This need to continuously interact with the data to provide useful products, to complete appropriate levels of quality assurance, and the need to apply the data to appropriate references for successful application has led to the concept of the CO-OPS Center of Data for the NOS tide and tidal current program. Subsets of specific products, such as hourly and monthly mean sea level are routinely made available to other data centers such as the Hawaii Sea Level Center (HSLC) and the Permanent Service for Mean Sea Level (PSMSL).

1. Current Structure

a. Data Administration

CO-OPS operations are conducted under the umbrella of an overall Data Quality Assurance Plan (DQAP) that is currently under review and revision. The DQAP is being supported by the ongoing development of Standard Operating Procedures (SOP's), Specifications and Standards for in-house and contractor use, and error budgets. The DQAP goal is Level III operations (after MacFarland) due to the frequent use of CO-OPS data and products in litigation and legal reference.

A key support systems for NWLON and PORTS are the NWLON Data Management System (DMS), the National PORTS Database, and the PORTS Data Acquisition Systems at PORTS sites. CO-OPS supports the NWLON and PORTS programs by dedicating all of its teams to the operational readiness of its systems. All CO-OPS products are initially quality controlled by the Continuous Operational Real-Time Monitoring System (CORMS). CORMS provides 7 day a week, 24 hour a day monitoring and quality control of sensors and data in order to insure the availability, accuracy, and quality of tide, water level, current, and other marine environmental information. CORMS is intended to identify invalid and erroneous data and information before application of the data by real-time and near real-time users. CO-OPS oceanographers perform

subsequent quality control and quality assurance functions during the routine processing and analysis of the data during the generation of products and services.

b. Data Sets

CO-OPS and its predecessors have been collecting water level and tidal current data since the mid-1800's. Short-term subordinate water level stations may operate from a few days to several years depending upon the requirement. Long term water level stations are installed for coverage of the coastline (NWLON) and PORTS and operate indefinitely. About 6,000 subordinate water level stations have been installed over the years. Over 100 of the NWLON stations have been in continuous operation for over 19 years with an additional 60 in operation for over 50 years. Three Great Lakes stations and one tide station have been in continuous operation since the mid-1800's. Several hundred current short-term current meter stations have operated from a few hours up to a few months. Long-term current meters station typically were considered from two to six-months, however with PORTS, very long-term current meter records are now starting to be established (several months to several years). Each of the six PORTS has from one to four current meters in operation at any one time. Long-term ancillary data sets associated with the selected tide stations and PORTS are also starting to be accumulated for water temperature and density, wind speed and direction, barometric pressure, and air temperature.

c. Customers and Users

The Office programs support military and civilian customers, state and local governments, academia, private industry, and the general public. The list of customers includes but is not limited to the U.S. Navy, the U.S. Coast Guard, Port Captains, Harbor Pilots, Commercial Shippers, Marine Exchanges, Vessel Information Centers, Surveyors, Engineers, Hydrographers, Demolition Companies, Barge Operators, Ferry Operators, Hazardous Material Operators, Harbor Planners, U.S. Department of Justice, U.S. Geological Service, U.S. Corps of Engineers, National Science Foundation, NASA, Defense Mapping Agency, the Environmental Protection Agency, the Federal Emergency Management Agency, the National Weather Service, the National Marine Fisheries Service, Local Police, and Recreational Users such as Fishermen and Boaters.

d. Is there metadata?

Metadata for NWLON and PORTS are continuously being generated and stored in hard copy and digital form. Historical metadata are generally in hard copy or microfiche form and are the subject of past and present data rescue and recovery efforts. Although the metadata exist, they haven't been necessarily been processed and presented using the latest national metadata standards and protocols.

e. Can the data be accessed?

Products and services as a result of the Office programs include but are not limited to (1) Internet

access (web, Telnet, ftp) to a standard suite of CO-OPS products which include data observations, data inventories, historical data, tidal datums, and benchmark information; (2) text-based real time data displays at remote locations and on the CO-OPS web; (3) a voice data product available via dial up touch tone phone speaking the latest real time observations; (4) graphical representations of all real-time observations as well as predictions (time series, vertical profiles, and along channel graphics); (5) CORMS for quality control; (6) special hazards and event home page providing observational data for FEMA and the NWS; and (7) the PORTS Information Hub providing one stop shopping for all PORTS and PORTS related products.

The CO-OPS Web Home page (www.co-ops.nos.noaa.gov) allows a user to view or download water level station location information, data inventories, tidal datum and bench mark information, and general information and reports. The user can download preliminary, near-real time water level data and view PORTS data in near-real time. Integrated data base queries allow a user to obtain long-term verified hourly height, high and low water and monthly mean time series through the Web interface. Ancillary meteorological and oceanographic data are also available from selected locations. A several year effort of data recovery is now paying off, with several long term stations now having complete hourly height data sets available. Further significant efforts are still required to ensure recovery of the hard-copy metadata associated with the data themselves and preservation of few selected sets of marigrams from the longest operating stations. Linkages are also being put in place between NGS and CO-OPS databases for geodetic and tidal bench mark elevation information.

f. Archives

Historical data and some associated metadata in the form of tide and water level gauge marigrams have been stored in the NOAA archive system and on microfiche. Obtaining digital data sets and digital metadata have been the subject of data rescue and recovery efforts over the past decade as the marigrams and microfiche records are deteriorating over time. Digital archive processes for the increasing amount of incoming data are being developed as part of the overall data base management strategies.

E. Future Plans

A. Projections

Projections for both the NWLOP and PORTS programs are highly dependent upon FY 2000 budget negotiations presently underway between the President and Congress. PORTS, especially is heavily dependent upon requested funding levels. The NWLOP would be expected to remain a stable program over the next several years with a fairly consistent level of operating long-term and short-term water level stations under the requested budget. There will be an increasing level of emphasis on the real-time acquisition and application of the data during storm events, tsunami events, and HAZMAT events. The NWLOP would not be a healthy program under level funding scenarios and

would require serious infusion of funds to remain healthy in the out years. The PORTS program would rapidly expand and grow by an order of magnitude over the next several years under requested funding levels. Long-term current meter measurements and ancillary oceanographic and meteorological measurements would rapidly accumulate. Operationally, increased partnerships and use of contractors will intensify. If the requested funding levels are eliminated, as they were in the first congressional negotiations, then the national PORTS program will be shut down.

B. Next Steps

CO-OPS will continue to support the original NOS synergy teams. For instance, CO-OPS is supporting the NOS Spatial Data Synergy team efforts to develop GIS-type interfaces to significant data layers represented by selected CO-OPS products and continues to provide input into the NOS Nutrient Pollution Teams and Dredging Teams efforts. CO-OPS will look for additional support for the NWLOP and densification of coastal observation water level networks through the NOAA initiative process and seeking to integrate coastal observation programs increasingly with the National Weather Service as is now being done with the NWS Southern Region, and NDBC. CO-OPS will continue to provide new products and services for HAZMAT and storm surge applications and new products for NOAA nautical charting program support. CO-OPS will continue to conduct non-rel-time current meter surveys at locations critical to the navigation community for the purpose of upgrading tidal current prediction products.

CO-OPS plans to continue active development of the CO-OPS Web Home Page which allows users access to data, information, and products through controlled queries to the data bases. Specialized Web pages will be developed for specific uses, such as a Hazards Home Page populated during specific storm or HAZMAT events. Historical data will continue to be quality-controlled, loaded onto the data bases and made available over the CO-OPS Home page. CO-OPS philosophy continues to have all data made available to all users over the Web free of charge. CO-OPS strategic plans are to continue to have CO-OPS manage the Center of Data for tide current information and to continue to establish dynamic data base links to other centers of data such as was accomplished with NGS over the past year.

C. Budget Items FY02

To operate healthy coastal observational programs into FY2002, the level of funding required would be approximately \$2.0m per year to continue effective operation of the NWLON, provide nationwide support to NWS, USACE, and NOS programs, and continue to densify coastal observational networks in key areas.

CSC INPUT

CSC Mission

The mission of the NOAA Coastal Services Center is to *foster and sustain the environmental and economic well being of the nation's coast by linking people, information, and technology.*

With a strong emphasis on partnerships, the Center works with people in coastal communities (individuals, organizations and agencies) to identify specific coastal management issues or challenges. The Center provides a variety of services and technologies to this audience, including:

- C Training
- C Coastal Management Fellowships
- C Geographic information system (GIS) and programming support
- C Remote sensing of terrestrial and aqueous habitats
- C Virtual coastal library
- C Internet access to information and data
- C Watershed characterization and restoration planning
- C Technology innovation and commercialization
- C Conference support

Each year the Center is involved in over 100 projects with local, state and federal partners. These projects address a specific need in a specific area, but the technology used and the processes developed can be applied nationally. The Center views its customers as the coastal community, which includes scientists, policy-makers, regulators, and the public.

Ongoing Monitoring Activities. The Coastal Services Center does not routinely engage in operational monitoring programs. Instead, we work with partners to build their capacity to acquire coastal data and information in a more reliable and efficient manner. Often, this may include collection of baseline data sets. Reflecting this approach, the ongoing projects listed below focus on technology development and capacity building rather than operational monitoring.

Coastal Land Cover Change Analysis

The NOAA Coastal Change Analysis Program in cooperation with state, federal, and university partners, uses remote sensing (aircraft, satellite, and *in situ*) to classify land cover in coastal upland, wetland, and submerged (aquatic vegetation) habitats. Subsequent classifications are used to document changes in these resource areas and help coastal managers understand the consequences of these changes. Expected outcomes of these cooperative projects are the production and use of digital habitat classifications and change analysis. Of the Center's activities, this program probably best fits the definition of monitoring.

Ongoing and Planned Projects (with cooperators):

- C Coastal Oregon Land Cover Change (Oregon Department of Fish and Wildlife)
- C Chesapeake Bay Land Cover Trend Analysis Prototype (Virginia Institute of Marine

- Science, College of William and Mary)
- C Long Island, New York Land Cover Change (State University of New York, Albany and the New York Division of Coastal Resources)
 - C Coastal New Jersey Land Cover Change (Rutgers University)
 - C North Carolina Land Cover Change (North Carolina Center for Geographic Information and Analysis and the NC Division of Coastal Management)
 - C Georgia Land Cover Change (University of Georgia)
 - C Florida Land Cover Change (Florida Department of Environmental Protection and the U.S. Geological Survey GAP Analysis Program)
 - C Coastal Louisiana Land Cover Change (U.S. Geological Survey, National Wetlands Research Center)
 - C Coastal Texas Land Cover Change (Texas Parks and Wildlife Department)
 - C Coastal Washington Land Cover Change Analysis (University of Washington)
 - C Hudson River Seagrass Mapping (Institute of Ecosystem Studies, the Hudson River National Estuarine Research Reserve, and the Cornell Laboratory for Environmental Application of Remote Sensing)
 - C Massachusetts Land Cover Change Analysis and Massachusetts Seagrass Mapping (Massachusetts Department of Environmental Protection).
 - C Northern California Land Cover and Habitat Analysis (National Marine Fisheries Service Office of Habitat Conservation and Humboldt State University).

Completed Projects:

- C Yakutat Bay, Alaska Land Cover Change
- C Columbia River Estuary Land Cover Change Analysis
- C San Francisco Bay Area Land Cover Change Analysis
- C Chesapeake Bay Land Cover Classification
- C St. Croix River Area Land Cover Change Analysis
- C Coastal South Carolina Land Cover Change Analysis

Target client groups include:

- State/Local Planners
- Federal/State Wildlife Management Agencies
- Other Federal Agencies
- Non-Governmental Organizations
- Universities
- General Public
- Coastal resource managers and applied research scientists
- State/Local GIS users
- Other NOAA

Development of Remote Sensing Techniques for Mapping Coral Reefs

The NOAA Coastal Change Analysis Program (C-CAP), is currently cooperating with the NOAA/Center for Coastal Monitoring and Assessment to test new methods of mapping tropical coral reefs. The outcomes are expected to be methodologies, classifications, and protocols for

application to Pacific coral reef mapping efforts. Target client groups include:

- State/Local Coastal Management Agencies
- State/Local Coastal Regulatory Agencies
- Federal/State Wildlife Management Agencies
- Other Federal Agencies
- Private Sector Industry
- Coastal resource managers and applied research scientists
- Federal Protected Area Managers
- State/Local GIS users
- NOAA
- NOS AA Office

Remote Sensing of Coastal and Estuarine Water Quality

The Center's Coastal Remote Sensing Program undertakes applied research on new aircraft and satellite remote sensing technologies to assess the ability of these sensors to provide information on water quality (as indicated by optical properties) that would be of value to coastal managers. In collaboration with NASA, CSC assesses the potential of aircraft-based measurements of chlorophyll, salinity, temperature, and turbidity to routinely monitor water quality and validate models of land cover change impacts on estuaries and embayments. Algorithms to evaluate coastal water quality, biological variables, and geologic variables based on remote sensing data from satellite or aircraft are developed in partnership with NASA, NOAA-NESDIS, NOAA-NOS, and USGS. High quality bio-optical data is collected by CSC to evaluate and develop coastal ocean color algorithms. Regions of intensive data collection include the Gulf of Maine and the coastal waters of the South Atlantic Bight. Anticipated outcomes are more cost efficient methodologies for monitoring estuarine water properties. The project is not in itself a monitoring project, but is developing techniques that could be applied to monitoring programs. Target client groups include:

- State/Local Coastal Management Agencies
- State/Local Coastal Regulatory Agencies
- Applied research scientists

Coastal Ocean Habitats

CSC creates, integrates, and assembles near-real time and retrospective remote sensing data sets and associated information that would be useful for addressing coastal management issues. Specific projects using these data include the detection of long-term seasonal and event-specific trends in water turbidity and sea surface temperature and the development of a prediction and monitoring system for harmful algal blooms in the eastern Gulf of Mexico. The Center is a Coast Watch National Center, receiving both AVHRR and SEAWiFS satellite imagery. The project will produce comprehensive information on coastal water variables (biological, optical, and physical) and their trends for U.S. coastal oceans and large estuaries and embayments. Target client groups include:

- State/Local Coastal Management Agencies
- State/Local Coastal Regulatory Agencies
- Applied research scientists

Harmful Algal Bloom (HAB) Forecasts

Harmful or nuisance algal blooms impact coastal ecosystems and coastal communities, including economic and public health effects. The HAB Forecasts Project works with NOAA-funded researchers towards the development of a prediction and monitoring system for HABs in US coastal regions. In FY96, the project focused attention on west Florida coast red tide blooms of the dinoflagellate *Gymnodinium breve*. This toxic species has a distribution ranging from the Gulf of Mexico to the South Atlantic Bight, and produces neurotoxins and hemolytic substances that cause mass mortalities of marine animals, neurotoxic shellfish poisoning (NSP), and human respiratory irritation. As a first step towards the design of a remote sensing-based red tide forecasting system for this species, the project organized and hosted a workshop entitled "Applications of Remote Sensing to Red Tide Forecasts in the Gulf of Mexico". In FY 98 the project published the results of this workshop, and began developing a design for an eastern Gulf of Mexico HAB forecast system based on the workshop recommendations.

In FY98 and 99, the project began collecting of historical and near-real-time data that was placed into a framework that allows internet access to imagery, buoy, and bloom conditions in a spatial context. This structure is designed to allow data to be freely transferred between an internet (JAVA) or GIS (ARCVIEW) display system. During FY2000, we will work with researchers and NODC to provide increased access to data in a GIS format. Other activities in FY2000 will include evaluating the use of wind data to forecast the demise of a bloom and the use of aircraft and satellite data to monitor the presence and progression of the bloom. The project is not in itself a monitoring project, but is developing a framework to organize and integrate monitoring information related to harmful algal blooms.

Target client groups include:

- State/Local Coastal Management Agencies
- State/Local Coastal Regulatory Agencies
- Federal/State Wildlife Management Agencies
- Non-Governmental Organizations
- Coastal resource managers and applied research scientists

Topographic Change Mapping

The Coastal Topographic Mapping project is collecting high-resolution topographic and other spatial data sets in response to the need for accurate, timely information on beach and dune field topography. The data collection and analysis (including analysis of change over time in selected locations) is done in partnership with USGS and NASA. The project is distributing these data, derived information products and analysis tools to our customers for use in coastal zone decision making processes. The project is also working to establish a protocol for operational airborne laser topographic mapping. Target client groups include:

- State/Local Coastal Regulatory Agencies
- Internal NOAA/CSC
- Beach management staff in federal, state and local governmental agencies
- Coastal resource managers and applied research scientists

Protected Areas GIS (PAGIS)

Coastal and marine protected areas are a critical link in the effort to conserve natural ecosystem functions along the nation's coasts. The Protected Areas GIS (PAGIS) project is an NOS-wide initiative to develop fully integrated GIS, spatial data management, and Internet capabilities at all National Estuarine Research Reserves and National Marine Sanctuaries. CSC has the lead technical role in this project and is primarily responsible for coordinating the GIS hardware and software purchase, providing GIS and metadata training, developing spatial data layers and associated metadata, and creating and maintaining an Internet home page with interactive GIS applications. The relevant management issue addressed is the acquisition and management of spatial data, which are likely to include land cover, elevation, and water quality. This effort provides the infrastructure and baseline data sets for monitoring activities, providing the Reserves the capacity to integrate monitoring results into a coherent spatial framework. The Reserves may then use these data to enhance management of their trust resources. Partners include the National Marine Sanctuaries Division and the Estuarine Reserves Division of NOS and the state partners at each NERR. In FY00, the project will acquire and deliver additional data sets and devote effort to developing specialized applications to meet particular needs at the Reserves.

As, part of the PAGIS Project, the Coastal Services Center is working with the Estuarine Reserves Division, several of the Reserves, and private contractors to map benthic habitats within the Reserves. Methodologies include benthic grab samples, sediment profile photography, and acoustic mapping. Ongoing projects include Apalachicola Bay NERR and Hudson River NERR. Candidates for future benthic mapping include Wells NERR and Elkhorn Slough NERR.

Target client groups include:

- State/Local Coastal Management Agencies
- Universities
- Internal NOAA/CSC
- Federal Protected Area Managers
- National Marine Sanctuaries and National Estuarine Research Reserves
- NOAA

FY02 CSC Monitoring Initiatives

The Coastal Services Center is not putting forward FY02 Investment Proposals to conduct monitoring programs. The Center is, however, submitting several investment proposals for FY02 that create frameworks for ingesting and integrating data streams from monitoring programs. These are summarized below.

Digital Ports

Balancing commercial interests while protecting and restoring critical habitat in our nation's ports has quickly become one of the most significant challenges of seaport coastal stewardship. To support this sustainable growth an arsenal of tools are necessary, but most important are the foundation data sets and analysis tools needed for supporting wise decisions. This initiative will develop a national spatial data framework approach to port stewardship while developing local place-based implementations in individual harbors. This initiative leverages existing NOS mapping efforts such as the electronic nautical chart (ENC) development and Physical Oceanographic Real-Time System (PORTS). Many of the same spatial data that are necessary for ENC and PORTS are also important when mapping critical habitat, developing dredge material management plans, and identifying habitat restoration sites. This initiative will develop the national standards and protocols of a geographic spatial framework necessary for addressing coastal issues in ports.

The approach to this initiative is to continue to build on the federal, state, and local partnerships that have been initiated with Digital Coast, NSDI and PORTS. The Coastal Services Center (CSC) will work closely with the Office of Coast Survey (OCS), the U.S. Geological Survey (USGS), the Federal Emergency Management Agency (FEMA), U.S. Department of Transportation (DOT), and private industry to put together the national protocol and individual place based framework and systems. In addition, the Centers for Operational Oceanographic Products and Services (CO-OPS), the Office of Response and Restoration (ORR), and the National Geodetic Survey (NGS) will be relevant offices to this initiative.

Starting with the Port of Tampa, Florida and the three county surrounding area, the initiative will integrate data sets such as elevation, bathymetry, electronic nautical charts, salinity, flood plain, coastal habitat, benthic habitat, socio-economic data, LIDAR, land-use, land-cover, dredge disposal sites, artificial reef sites, marine boundaries, parcel mapping and marine transportation. The initiative will use digital technologies such as GIS, decision support tools, remote sensing, PORTS to install a system that can be used by the local ports authority to manage the site. The strategy will be to use this site as a prototype to assist in developing a national set of standards and protocols.

Coastal Communities - Recreation, Tourism and Open Space

Promoting sustainable, livable communities requires attention to tourism and recreation industries and the open space that support them. This is a complex set of issues includes private industry, community development needs, and environmental considerations and this particular initiative focuses on the social and economic elements.

We envision working with private industry since their interests and needs are linked to the recreation and tourism issues. By contributing to the development of the National Survey on Recreation and the Environment, and through partnerships with Sea Grant and the NERR networks, the Center will track and integrate human dimension-related data and information into the development of tools, outreach and communications networks, as well as training programs. Specifically, the Center will focus on information that characterizes human use of open space and trends in tourism and recreation, develop

methods of spatially-depicting these uses and trends, and pilot test and implement training of local officials in conjunction with networks.

Coral Reef Information Framework

The effects of changing environmental conditions on coral reefs are not well understood. As the U.S. and many other nations face the prospect of loss of these fragile ecosystems, it is increasingly necessary to collect, organize, share and analyze data to help determine how governments can best protect their reefs.

Working with established federal, state, territorial, and academic programs in the Pacific, Atlantic, Caribbean, and Gulf of Mexico, this initiative will establish an ongoing process to identify, update, create, or complete maps and other pertinent data for the worlds coral reefs. This initiative will also create a system, using web-based technology, to provide interactive access to coral reef-related information and technology.

Coastal Habitats Provide Human Services

Coastal ecosystems provide our society with a suite of services essential to healthy living and well-balanced communities. Every day, we expect coastal ecosystems to provide us with places to recreate and conduct commerce, to nurture the fish and shellfish caught by fisherman, to filter runoff from our lands, to dilute and detoxify sewage, and to sequester solid waste.

The amount and quality of the habitats within an ecosystem determine the level of services that can be provided. Yet no one has critically examined the balance sheet to determine whether the habitats present today are sufficient for sustaining the level of services currently provided to society or, perhaps more importantly, for meeting the needs of future communities. This habitat program would integrate information from federal and non-federal sources to forecast the future levels of services society will expect from coastal systems and to determine the diversity, amount, and spatial distribution of habitats needed to deliver those services. Results will provide a framework that allows local communities to examine whether their management decisions will yield the quality of life they wish to provide over the long term; and, if not, to explore appropriate remedial actions, such as decreasing demands, developing alternative service-delivery mechanisms, or rehabilitating and/or restoring coastal habitats.

This work will cut across NOAA offices, federal agencies, and state and local governments, building upon base activities and the successful FY2001 Sustained Healthy Coast initiative. Existing information would be refined and added to new information to identify and quantify the services society expects from coastal ecosystems, the amounts of habitats present, and the links between those habitats and the services provided. Work would be done to transform static descriptions into temporally dynamic, process-focused understandings of social, physical, ecological and geochemical influences on the relationships between habitats and services. Integrated environmental and socioeconomic models would be developed to sharpen those understandings, to explore relationships between disparate processes, and to forecast the effects of various pressures on the relationships

between habitats and societal services.

Special Projects Office Socioeconomic Monitoring Activities

Special Projects Office does not conduct environmental monitoring per se. However, as part of its Coastal and Ocean Resource Economics (CORE) program, it conducts efforts that can be described as socioeconomic monitoring at two levels – estimating use patterns and impacts in National Marine Sanctuaries and assessing the level and value of recreational activities for coastal areas at a state, regional and national scale. It also has built and maintains the Coastal Assessment and Data Synthesis (CA&DS) system, an internet based mapping, analysis, and data delivery capability for national and regional assessment support. CA&DS could serve as the foundation for organizing and disseminating a national picture of NOS monitoring activities and data that also provides the capability to associate this information with a variety of context setting national data sets.

Present Monitoring Activities, Outcomes, and Users

Sanctuary Level - At the Sanctuary level, current efforts involve directing socioeconomic monitoring in the Florida Keys National Marine Sanctuary (FKNMS) and plans are to begin similar monitoring for the Channel Islands Sanctuary in FY2000. The goal is to provide the information and knowledge necessary to make informed decisions about protecting the biological resources and ecosystem of the Sanctuary and its resources. This is accomplished through a variety of techniques, including administering surveys to Sanctuary users (intercept surveys), and employing a range of observation approaches (including remote sensing) to measure use. Products will include data and associated analyses on usage patterns, compliance with sanctuary regulations, user knowledge of sanctuary management strategies, socioeconomic impact of the use of specific sanctuary resources on sectors of the local economy, etc. These will be made available in hard copy reports and over the web.

The primary users of this information will be the managers of each Sanctuary, who will use the information to ensure that sanctuary management, local businesses and other stakeholders are fully informed as to the nature of and magnitude of the demand for these resources. Secondary users include those economic sectors that benefit from knowing the activity patterns of Sanctuary users, such as charter operators and the tourism industry, OCRM headquarters, other NOS offices (NCCOS, ORR), other Federal agencies, state agencies, NGOs, state and Federal legislatures, and the general public.

National Level - For the national level, the current efforts are centered on the National Survey of Recreation and the Environment (NSRE). The NSRE is a nationwide cooperative effort involving a variety of public agencies and private organizations. The goal is to establish benchmark data to help policy makers and decision-makers understand recreational use and public attitudes towards natural resources and resource management. The NSRE is being developed as a compatible, but expanded, “next-generation” National Recreation Survey (NRS). The NRS has been the standard recreation survey of the US since 1960. Resulting data and reports have been used extensively by Federal, state

and local agencies, as well as by universities and the private sector. The survey takes place every five years. This year, for the first time, a coastal recreation module will be implemented that will gather information specifically about the use of coastal resources for recreation. This will be achieved by conducting 50,000 detailed telephone surveys of randomly selected individuals. Because of the comprehensive nature of the data collected and the variety of interests of the funding partners, the products resulting from this project will be wide ranging. From NOAA's point of view, this survey represents the first time nationwide data has been gathered on the recreation use and public attitudes toward resource use and management for the coastal and ocean region. Products will include printed reports and web offerings.

There will be a variety of users of this information, including: NOS offices (OCRM, CSC, ORR), other components of NOAA (NMFS), other Federal agencies (EPA, ACOE, DOI), State and local environmental management agencies, regional management agencies, NGOs, academic researchers, private sector interests (tourist industry), Federal and state legislatures, and the general public.

Long-term vision and goals

The long-term vision for the marine protected area monitoring program is to work cooperatively with the Marine Sanctuary and Research Reserves programs in OCRM to further develop and undertake this type of socioeconomic monitoring and assessment on an expanded basis all of NOS's interests in marine protected areas. This would involve initiating one or more monitoring efforts in NOS's protected areas each year, with periodic re-monitoring to develop economic trend information. For marine sanctuaries, this could be timed to provide input to the required Management Plan revisions every five years. The need and timing for a similar effort for NERRS sites is still be determined.

For the national program, the vision is to fulfill NOAA's commitment to complete the NSRE program, with a possible expansion of the issues investigated or a more intensive survey in selected locations. However, the NSRE only addresses socioeconomic issues related to recreation. We have a broader vision that NOS should lead an effort, in partnership with other Federal, state, and local stakeholders, to undertake a periodic (e.g., every five year) national monitoring/data synthesis activity that would characterize socioeconomic conditions and trends at a coastal county level. This activity would provide information across key economic sectors important to developing sustainable coastal communities and directing national and regional policy. It would be coordinated with the NSRE, but would provide a wealth of additional information on sectors such as ports and commercial fishing that would be of direct benefit to NOS's state and local constituents, would be designed to support NOS's Tier I national environmental monitoring program, and would provide the information needed to more completely describe the national and regional status of the economic health and value of the coast.

FY02 SPO Monitoring Initiatives

Pending guidance from the SMC on FY02 priorities, the Special Projects Office will work with NOS offices to develop an Investment Proposal to support expansion of the marine protected areas socioeconomic monitoring program.

After further discussion with key program offices, a proposal outlining the need and benefits of a National Coast And Ocean Socioeconomic Monitoring Program will also be developed.